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Dechlorination of Trichloroethylene in Groundwater by Nanoscale Bimetallic Fe/Pd Particles

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ABSTRACT

Palladium/iron bimetallic nanoparticles were synthesized using microemulsion method in the water-in-oil (W/O) microemulsion system, which was made up of iso-octane, cetyltrimethyl-ammonium bromide (CTAB), butanol and water and characterized by measuring the conductivity of the solution. Transmission electron microscope (TEM) and energy dispersive X-ray microanalysis (EDX) analysis showed that the av-erage diameter of synthesized palladium/iron bimetallic nanoparticles was less than 80 nm, which was much smaller than the particles produced by the solution method. The palladium/iron bimetallic nanoscale particles produced in the laboratory showed better performance on dechlorinating TCE than the other materials. The nanoscale Fe/Pd particles exhibited high reactivity. When Pd content is 0.5%, the best TCE dechlorination efficiency is achieved within 30min. And Fe/Pd nanoparticles show persistent reaction activity in some sense.

KEYWORDS

Trichloroethylene, Microemulsion, Nanoscale Pd/Fe Particles

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